



Volunteer Lake Assessment Program Individual Lake Reports

DEERING RESERVOIR, DEERING, NH

MORPHOMETRIC DATA

| | | | | | | | | |
|-----------------------|-------|---------------------------|-----------|-----------------------------------|------|------|---------------|----------------------|
| Watershed Area (Ac.): | 2,816 | Max. Depth (m): | 11.3 | Flushing Rate (yr ⁻¹) | 1.3 | Year | Trophic class | KNOWN EXOTIC SPECIES |
| Surface Area (Ac.): | 315 | Mean Depth (m): | 3.5 | P Retention Coef: | 0.67 | 1980 | MESOTROPHIC | |
| Shore Length (m): | 8,850 | Volume (m ³): | 4,442,500 | Elevation (ft): | 921 | 1997 | OLIGOTROPHIC | |

The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm

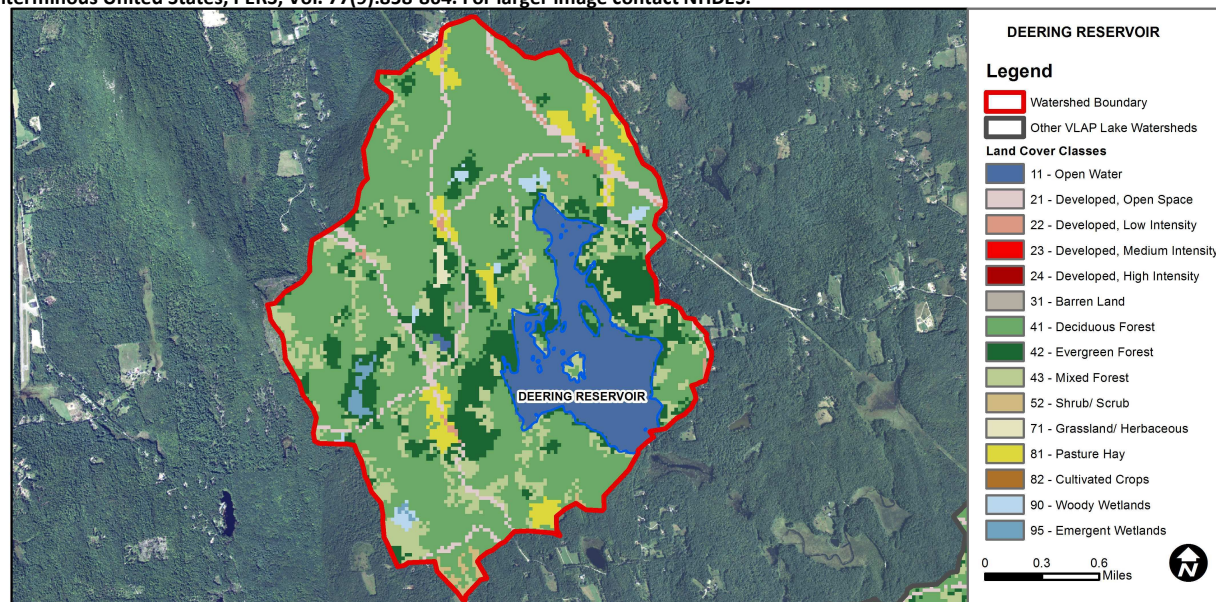
| Designated Use | Parameter | Category | Comments |
|----------------------------|-----------------------------|--------------|---|
| Aquatic Life | Phosphorus (Total) | Good | The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator and the chlorophyll a indicator is okay. |
| | pH | Bad | >10%, with a minimum of 2, samples exceed criteria, with 1 or more by a large margin. |
| | Oxygen, Dissolved | Encouraging | There are < 10 samples with 0 exceedances of criteria. More data needed. |
| | Dissolved oxygen saturation | Slightly Bad | There are >10% of samples (minimum of 2), exceeding criteria. |
| | Chlorophyll-a | Good | The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator. |
| Primary Contact Recreation | Escherichia coli | Very Good | Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria. |
| | Chlorophyll-a | Very Good | There are a total of at least 10 samples with 0 exceedances of indicator. |

BEACH PRIMARY CONTACT ASSESSMENT STATUS

| | | | |
|--|------------------|-----------|---|
| DEERING RESERVOIR - HOPKINTON INDEPENDENT SCHOOL BEACH | Escherichia coli | Very Good | Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria. |
| DEERING RESERVOIR - DEERING LAKE BEACH | Escherichia coli | Bad | There are >=1 exceedance(s) of the geometric mean and/or >=2 single sample criterion exceedances. One or more exceedance is >2X criteria. |

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



| Land Cover Category | % Cover | Land Cover Category | % Cover | Land Cover Category | % Cover |
|----------------------------|---------|---------------------|---------|----------------------|---------|
| Open Water | 11.9 | Barren Land | 0.06 | Grassland/Herbaceous | 0.25 |
| Developed-Open Space | 4.22 | Deciduous Forest | 54.05 | Pasture Hay | 3.36 |
| Developed-Low Intensity | 0.71 | Evergreen Forest | 13.72 | Cultivated Crops | 0 |
| Developed-Medium Intensity | 0.03 | Mixed Forest | 9.69 | Woody Wetlands | 0.87 |
| Developed-High Intensity | 0 | Shrub-Scrub | 0.55 | Emergent Wetlands | 0.52 |



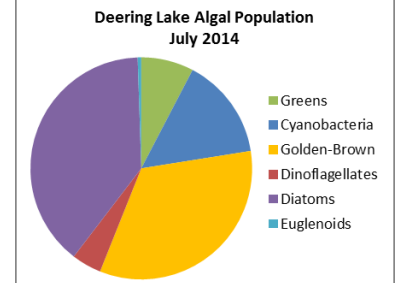
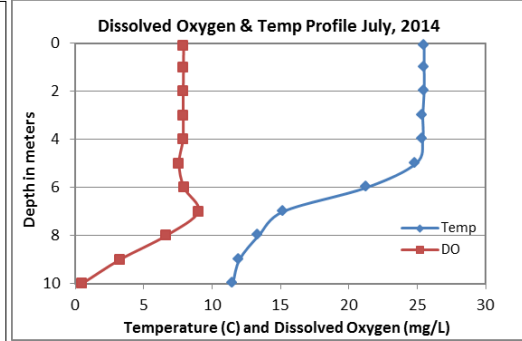
VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS

DEERING LAKE, DEERING

2014 DATA SUMMARY

OBSERVATIONS AND RECOMMENDATIONS (Refer to Table 1 and Historical Deep Spot Data Graphics)

- **CHLOROPHYLL-A:** Chlorophyll levels increased as the summer progressed however average levels decreased slightly from 2013 and were less than the state median. Historical trend analysis indicates highly variable chlorophyll levels since monitoring began.
- **CONDUCTIVITY/CHLORIDE:** Deep spot and Outlet conductivity and chloride were only slightly greater than the state median and remained stable throughout the summer. Historical trend analysis indicates stable epilimnetic (upper water layer) conductivity with moderate variability between years. Conductivity and chloride in Morotta Inlet continue to be elevated likely as a result of winter de-icing practices on nearby roadways.
- **TOTAL PHOSPHORUS:** Epilimnetic and metalimnetic (middle water layer) phosphorus levels were low throughout the summer and less than the state median. Historical trend analysis indicates stable epilimnetic phosphorus since monitoring began. Hypolimnetic (lower water layer) phosphorus levels increased moderately as the summer progressed potentially due to bacterial activity in bottom sediments using up dissolved oxygen and the potential release of phosphorus from lake sediments. Tributary phosphorus levels were low to average and were relatively stable throughout the summer.
- **TRANSPARENCY:** Transparency improved as the summer progressed and was best in August when lake surface conditions were calm. Historical trend analysis indicates stable transparency since monitoring began.
- **TURBIDITY:** Epilimnetic and metalimnetic turbidities were low throughout the summer, while hypolimnetic turbidity was slightly elevated on each sampling event. Morotta Inlet, Outlet and Zowski Inlet turbidities were slightly higher in June during high tributary flows.
- **pH:** Epilimnetic, metalimnetic and tributary pH were within the desirable range 6.5-8.0 units, however hypolimnetic pH levels decreased below the desirable range. Historical trend analysis indicates significantly decreasing (worsening) epilimnetic pH since monitoring began, however since 2011, epilimnetic pH has recovered and we hope to see this continue.
- **RECOMMENDED ACTIONS:** Overall, 2014 water quality was excellent. Work to reduce the chloride level in Morotta Inlet through utilizing best practices with winter de-icing activities. The UNH Technology Transfer Center produces winter de-icing educational materials at www.t2.unh.edu/green-snowpro-training-and-certification. Continue education and outreach efforts in the watershed to capture and infiltrate stormwater runoff prior to reaching the lake and tributaries to maintain lake health. Keep up the great work!



| Station Name | Table 1. 2014 Average Water Quality Data for DEERING RESERVOIR | | | | | | | | |
|---------------|--|-----------------|------------------|----------------|-----------------|-------------|------|--------------|------|
| | Alk. mg/l | Chlor-a ug/l | Chloride mg/l | Cond. uS/cm | Total P ug/l | Trans. m | | Turb. ntu | pH |
| | | | | | | NVS | VS | | |
| Epilimnion | 6.17 | 4.12 | 11 | 63.5 | 7 | 5.42 | 6.23 | 0.74 | 6.82 |
| Metalimnion | | | | 64.4 | 7 | | | 1.02 | 6.70 |
| Hypolimnion | | | | 65.6 | 13 | | | 2.10 | 6.38 |
| Main Inlet | | | 20 | 110.9 | 9 | | | 0.68 | 6.76 |
| Morotta Inlet | | | 52 | 303.3 | 13 | | | 1.26 | 6.96 |
| Outlet | | | 12 | 65.6 | 5 | | | 0.99 | 6.93 |
| Zowski Inlet | | | 19 | 105.3 | 11 | | | 1.04 | 6.95 |

NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.

Chloride: > 230 mg/L (chronic)

E. coli: > 88 cts/100 mL – public beach

E. coli: > 406 cts/100 mL – surface waters

Turbidity: > 10 NTU above natural level

pH: between 6.5-8.0 (unless naturally occurring)

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.

Alkalinity: 4.9 mg/L

Chlorophyll-a: 4.58 mg/m³

Conductivity: 40.0 uS/cm

Chloride: 4 mg/L

Total Phosphorus: 12 ug/L

Transparency: 3.2 m

pH: 6.6

HISTORICAL WATER QUALITY TREND ANALYSIS

| Parameter | Trend | Explanation | Parameter | Trend | Explanation |
|-----------------|-----------|--|-------------------------|--------|---|
| Conductivity | Stable | Trend not significant; data moderately variable. | Chlorophyll-a | Stable | Trend not significant; data highly variable. |
| pH (epilimnion) | Worsening | Data significantly decreasing. | Transparency | Stable | Trend not significant, data show low variability. |
| | | | Phosphorus (epilimnion) | Stable | Trend not significant, data show low variability. |

